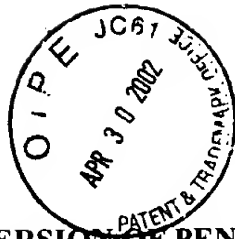


Docket No. 303.254US4
WD # 424943



Micron Ref. No. 96-0660.04

CLEAN VERSION OF PENDING CLAIMS

A SOLVENT PREWET AND METHOD TO DISPENSE THE SOLVENT PREWET

Applicant: John Whitman
Serial No.: 09/941,476

Claims 13-61, as of April 17, 2002 (Date of Response to First Office Action).

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13. An apparatus, comprising:
- a solvent dispense head in fluid communication with a source of a photo resist solution and in fluid communication with a solvent source containing a solvent that includes diacetone alcohol; and
 - a rotatable wafer-holding mechanism; and
 - a logic control unit adapted for executing a process to coat a wafer, wherein the process comprises:
 - distributing the solvent on a wafer surface; and
 - upon distributing the solvent, distributing the photo resist solution on the wafer surface.
14. The apparatus of claim 13, wherein the solvent dispense head includes:
- a first nozzle and a second nozzle in fluid communication with the source of photo resist solution; and
 - a third nozzle in fluid communication with the source of solvent.
15. The apparatus of claim 13, wherein, in the process performed by the logic control unit, distributing the solvent on the wafer surface comprises:
- dispensing the solvent on the wafer surface; and
 - actuating the rotatable wafer-holding mechanism to spin the wafer until the prewet solvent is distributed across the wafer surface.

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16. The apparatus of claim 13, wherein, in the process performed by the logic control unit, distributing the photo resist solution on the wafer surface comprises:

dispensing the photo resist solution on the wafer; and
actuating the rotatable wafer-holding mechanism to spin the wafer until the photo resist solution is distributed across the wafer surface.

17. The apparatus of claim 13, wherein the process performed by the logic control unit further comprises dispensing the solvent for edge bead removal after distributing the photo resist solution on the wafer surface.

18. The apparatus of claim 13, wherein:

the photo resist solution comprises a resin, a photoactive compound and a photo resist solvent; and

the photo resist solvent contained within the photo resist solution includes the solvent from the solvent source.

19. An apparatus, comprising:

a solvent dispense head in fluid communication with a source of a photo resist solution and in fluid communication with a solvent source containing a solvent that includes diacetone alcohol and aliphatic ester; and

a rotatable wafer-holding mechanism; and

a logic control unit adapted for executing a process to coat a wafer, wherein the process comprises:

dispensing the solvent on a wafer surface;

actuating the rotatable wafer-holding mechanism to spin the wafer until the

solvent is distributed across the wafer surface;

upon distributing the solvent, dispensing the photo resist solution on the wafer

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surface; and
actuating the rotatable wafer-holding mechanism to spin the wafer until the photo resist solution is distributed across the wafer surface.

20. (Amended) The apparatus of claim 19, wherein:
the solvent dispense head includes a nozzle in fluid communication with the solvent source; and

in the process performed by the logic control unit, dispensing the solvent on a wafer surface includes dispensing the solvent from the nozzle.

21. (Amended) The apparatus of claim 19, wherein:
the solvent dispense head includes:

a first nozzle in fluid communication with the source of photo resist solution;

a second nozzle in fluid communication with the source of photo resist solution;

and

a third nozzle in fluid communication with the solvent source; and

in the process performed by the logic control unit, dispensing the solvent on a wafer surface includes dispensing the solvent from the third nozzle, and dispensing the photo resist solution on the wafer surface includes dispensing the photo resist solution from the first nozzle and the second nozzle.

22. The apparatus of claim 19, wherein:
the solvent head includes:

a first nozzle directed at the edge and sides of the wafer;

a second nozzle directed at the back of the wafer; and

a third nozzle directed at the center of the wafer; and

in the process performed by the logic control unit, dispensing the solvent on a wafer

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surface includes dispensing the solvent from the third nozzle, wherein, upon distributing the photo resist material, the process further includes dispensing the solvent from the first nozzle for edge bead removal and dispensing the solvent from the second nozzle for cleaning the back of the wafer.

23. The apparatus of claim 19, wherein the solvent further includes aliphatic ester, and wherein a ratio of the diacetone alcohol and aliphatic ester ranges between 10% ester and 90% alcohol to 30% ester and 70% alcohol.

24. An apparatus, comprising:

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a solvent dispense head in fluid communication with a source of a photo resist solution and further in fluid communication with a solvent source containing a solvent that includes diacetone alcohol, wherein the solvent dispense head includes:

a first nozzle in fluid communication with the source of the photo resist solution;

a second nozzle in fluid communication with the source of the photo resist solution; and

a third nozzle in fluid communication with the solvent source; and

a rotatable wafer-holding mechanism; and

a logic control unit adapted for executing a process to coat a wafer, wherein the process comprises:

distributing the solvent on a wafer surface using the third nozzle; and

upon distributing the solvent, distributing the photo resist solution on the wafer surface using the first and second nozzles.

25. The apparatus of claim 24, wherein:

the first nozzle and the second nozzle are in fluid communication with the solvent source; and

the process executed by the logic control unit further comprises, upon distributing the photo resist solution, dispensing the solvent on the wafer using the first and second nozzles.

26. The apparatus of claim 24, wherein, in the process performed by the logic control unit, distributing the solvent on the wafer surface comprises:

dispensing the solvent on the wafer surface; and

actuating the rotatable wafer-holding mechanism to spin the wafer until the prewet solvent is distributed across the wafer surface.

27. The apparatus of claim 24, wherein, in the process performed by the logic control unit, distributing the photo resist solution on the wafer surface comprises:

dispensing the photo resist solution on the wafer; and

actuating the rotatable wafer-holding mechanism to spin the wafer until the photo resist solution is distributed across the wafer surface.

28. An apparatus, comprising:

a rotatable base for holding a wafer;

a solvent dispense head in fluid communication with a source of a photo resist solution and in fluid communication with a solvent source containing a solvent that includes diacetone alcohol;

solenoids for controlling flow of the photo resist solution and the solvent through the solvent dispense head; and

a logic control unit coupled to the solenoids and adapted for executing a process to coat a wafer, wherein the process comprises:

dispensing the solvent on a wafer surface;

spinning the wafer on the rotatable base until the solvent is distributed across the wafer surface;

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dispensing the photo resist solution on the wafer; and
spinning the wafer until the photo resist solution is distributed across the
wafer surface.

29. The apparatus of claim 28, wherein:
the photo resist solution comprises a resin, a photoactive compound and a photo resist
solvent; and

the photo resist solvent contained within the photo resist solution includes the solvent
from the solvent source.

30. The apparatus of claim 28, wherein the solvent dispense head includes:

a first nozzle in fluid communication with the source of the photo resist solution and
directed at the top of the wafer;

a second nozzle in fluid communication with the source of the photo resist solution and
directed at the back of the wafer; and

a third nozzle in fluid communication with the solvent source directed at the center of the
wafer.

31. The apparatus of claim 28, wherein the process adapted to be executed by the logic
control unit further includes dispensing solvent for edge bead removal after the photo resist
solution is distributed across the wafer surface.

32. An apparatus, comprising:

a rotatable base for holding a wafer;

a solvent dispense head, including:

a first nozzle in fluid communication with a source of a photo resist
solution;

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a second nozzle in fluid communication with the source of the photo resist solution; and

a third nozzle in fluid communication with a solvent source containing a solvent that includes diacetone alcohol;

solenoids for controlling flow through the first nozzle, the second nozzle and the third nozzle; and

a logic control unit coupled to the solenoids and adapted for executing a process to coat a wafer, wherein the process comprises:

- dispensing the solvent on a wafer surface using the third nozzle;
- spinning the wafer on the rotatable base until the solvent is distributed across the wafer surface;
- dispensing photo resist solution on the wafer using the first nozzle and the second nozzle; and
- spinning the wafer until the photo resist solution is distributed across the wafer surface.

33. The apparatus of claim 32, wherein the third nozzle is directed at the center of the wafer.

34. The apparatus of claim 32, wherein:

- the first nozzle is directed at the edge and sides of the wafer;
- the second nozzle is directed at the back of the wafer;
- the first nozzle is in fluid communication with the solvent source;
- the second nozzle is in fluid communication with the solvent source; and
- the process executed by the logic controller further includes:
 - dispensing solvent through the first nozzle for edge bead removal; and
 - dispensing solvent through the second nozzle on the back of the wafer to clean the

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35. The apparatus of claim 32, wherein the source of photo resist solution includes a photo resist solvent, and wherein the source of the solvent and the photo resist solvent are from a common bulk solvent.
36. The apparatus of claim 32, wherein:
the photo resist solution comprises a resin, a photoactive compound and a photo resist solvent; and
the photo resist solvent contained within the photo resist solution includes the solvent from the solvent source.
37. An apparatus, comprising:
a rotatable base for holding a wafer;
a solvent dispense head in fluid communication with a source of a photo resist solution and a bulk solvent that includes diacetone alcohol;
solenoids for controlling flow of the photo resist solution and the bulk solvent through the solvent dispense head; and
a logic control unit coupled to the solenoids and adapted for executing a process to coat a wafer, wherein the process comprises:
dispensing the bulk solvent on a wafer surface;
spinning the wafer on the rotatable base until the bulk solvent is distributed across the wafer surface;
dispensing the photo resist solution on the wafer; and
spinning the wafer until the photo resist solution is distributed across the wafer surface.

38. (Amended) The apparatus of claim 37, wherein 70% of the bulk solvent is diacetone alcohol.

39. (Amended) The apparatus of claim 37, wherein 90% of the bulk solvent is diacetone alcohol.

40. The apparatus of claim 37, wherein between 70% and 90% of the bulk solvent is diacetone alcohol.

41. (Amended) The apparatus of claim 37, wherein:
the photo resist solution comprises a resin, a photoactive compound and a photo resist solvent; and
the photo resist solvent contained within the photo resist solution includes the bulk solvent.

42. An apparatus, comprising:
a rotatable base for holding a wafer;
a solvent dispense head in fluid communication with a source of a photo resist solution and a bulk solvent that includes a mixture of diacetone alcohol and aliphatic ester;
solenoids for controlling flow of the photo resist solution and the bulk solvent through the solvent dispense head; and
a logic control unit coupled to the solenoids and adapted for executing a process to coat a wafer, wherein the process comprises:
dispensing the bulk solvent on a wafer surface;
spinning the wafer on the rotatable base until the bulk solvent is distributed across the wafer surface;
dispensing the photo resist solution on the wafer; and

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spinning the wafer until the photo resist solution is distributed across the wafer surface.

43. The apparatus of claim 42, wherein the mixture of diacetone alcohol and aliphatic ester includes a ratio that ranges between 10% ester and 90% alcohol to 30% ester and 70% alcohol.

44. A system for coating a wafer, comprising:

a bulk solvent container, wherein a bulk solvent contained therein includes diacetone alcohol;

a low pressure canister connected to the bulk solvent container; and

a track coating unit connected to the low pressure canister, the track coating unit

comprising:

a solvent dispense head;

a rotatable base for mounting the wafer; and

a logic control unit adapted for executing a process to coat a wafer, wherein the

process comprises:

dispensing the bulk solvent on a wafer surface;

spinning the wafer on the rotatable base until the bulk solvent is

distributed across the wafer surface;

dispensing photo resist solution on the wafer; and

spinning the wafer until the photo resist solution is distributed across the wafer surface.

45. The system of claim 44, wherein the bulk solvent further comprises aliphatic ester.

46. The system of claim 44, wherein the bulk solvent comprises aliphatic ester and diacetone alcohol mixed in a ratio that ranges between 10% ester and 90% alcohol to 30%

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esther and 70% alcohol.

47. The system of claim 44, wherein the low pressure container is adapted to maintain proper fluid pressure and level for the track coating unit.

48. A system for coating a wafer, comprising:
a bulk solvent container, wherein a bulk solvent contained therein includes diacetone alcohol and aliphatic ester;
a low pressure canister connected to the bulk solvent container; and
a track coating unit connected to the low pressure canister, the track coating unit comprising:
a solvent dispense head;
a rotatable base for mounting the wafer; and
a logic control unit adapted for executing a process to coat a wafer, wherein the process comprises:
dispensing the bulk solvent on a wafer surface;
spinning the wafer on the rotatable base until the bulk solvent is distributed across the wafer surface;
dispensing photo resist solution on the wafer; and
spinning the wafer until the photo resist solution is distributed across the wafer surface.

49. The system of claim 48, wherein the bulk solvent includes a mixture of the aliphatic ester and the diacetone alcohol that ranges between 10% ester and 90% alcohol to 30% ester and 70% alcohol.

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50. (Amended) The system of claim 48, wherein the aliphatic ester and the diacetone alcohol are mixed in a ratio of 10% ester and 90% alcohol.
51. (Amended) The system of claim 48, wherein the aliphatic ester and the diacetone alcohol are mixed in a ratio of 30% ester and 70% alcohol.
52. (Amended) The system of claim 48, wherein the aliphatic ester is 10% of the bulk solvent.
53. (Amended) The system of claim 48, wherein the aliphatic ester is 30% of the bulk solvent.
54. (Amended) The system of claim 48, wherein the aliphatic ester is between 10% and 30% of the bulk solvent.
55. (Amended) The system of claim 48, wherein the diacetone alcohol is 70% of the bulk solvent.
56. (Amended) The system of claim 48, wherein the diacetone alcohol is 90% of the bulk solvent.
57. (Amended) The system of claim 48, wherein the diacetone alcohol is between 70% and 90% of the bulk solvent.
58. A system for coating a wafer, comprising:
a bulk solvent container, wherein a bulk solvent contained therein includes diacetone alcohol; and

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a track coating unit coupled to the bulk solvent container, the track coating unit comprising:

- a solvent dispense head;
- a rotatable base for mounting the wafer; and
- a logic control unit adapted for executing a process to coat a wafer, wherein the process comprises:

- dispensing the bulk solvent on a wafer surface;
- spinning the wafer on the rotatable base until the bulk solvent is distributed across the wafer surface;
- dispensing photo resist solution on the wafer;
- spinning the wafer until the photo resist solution is distributed across the wafer surface; and
- dispensing the bulk solvent on the edge and sides of the wafer and on the back of the wafer for edge bead removal and cleanup after distributing the photo resist.

59. (Amended) The system of claim 58, wherein the solvent dispense head comprises nozzles, and the track coating unit further comprises solenoids coupled to the logic control unit for controlling the flow through the nozzles.

60. The system of claim 58, wherein the bulk solvent further includes aliphatic ester.

61. The system of claim 58, wherein the bulk solvent further includes aliphatic ester to form a mixture that has a ratio between 10% ester and 90% alcohol to 30% ester and 70% alcohol.

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